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SEQUENCE LISTING

<110> Logan, Susan M.  
Wakarchuk, Warren  
Conlan, Wayne  
Monteiro, Mario A.  
Altman, Eleonora  
Hiratsuka, Koji

<120> GLYCOSYLTRANSFERASES OF HELICOBACTER PYLORI AS A NEW  
TARGET IN PREVENTION AND TREATMENT OF H. PYLORI  
INFECTIONS

<130> 12243.24USWO

<140> 10/019,214

<141> 2001-12-21

<150> PCT/CA00/00777

<151> 2000-06-28

<150> 60/140,820

<151> 1999-06-28

<160> 16

<170> PatentIn Ver. 2.1

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<212> DNA

<213> Helicobacter pylori

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<213> Helicobacter pylori

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                   35                                  40                                  45  
 Glu Gly Gly Leu His Pro Leu Val Lys Lys His Leu His Pro Tyr Phe  
                   50                                  55                                  60  
 Ile Thr Gln Asn Ile Lys Asp Met Gly Ile Thr Thr Asn Leu Ile Ser  
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 Glu Val Ser Lys Phe Tyr Tyr Ala Leu Lys Tyr His Ala Lys Phe Met  
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 Ser Leu Gly Glu Leu Gly Cys Tyr Ala Ser His Tyr Ser Leu Trp Glu  
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 Lys Cys Ile Glu Leu Asn Glu Ala Ile Cys Ile Leu Glu Asp Asp Ile  
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 Thr Leu Lys Glu Asp Phe Lys Glu Gly Leu Asp Phe Leu Glu Lys His  
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 Ile Gln Glu Leu Gly Tyr Ile Arg Leu Met His Leu Leu Tyr Asp Ala  
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 Ser Val Lys Ser Glu Pro Leu Ser His Lys Asn His Glu Ile Gln Glu  
                   165                                  170                                  175  
 Arg Val Gly Ile Ile Lys Ala Tyr Ser Glu Gly Val Gly Thr Gln Gly  
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 Tyr Val Ile Thr Pro Lys Ile Ala Lys Val Phe Leu Lys Cys Ser Arg  
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 Lys Trp Val Val Pro Val Asp Thr Ile Met Asp Ala Thr Phe Ile His  
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 Gln Ile Ser Thr Ile Ala Arg Lys Glu Glu Pro Tyr Ser Pro Lys Ile  
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Glu His Pro Gln Ser Gln Asn Asp Ser Glu Lys Leu Phe Tyr Lys Ile
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His Cys Leu Val Asp Asn Leu Ser Leu Glu Asn Gln Ser Lys Leu Lys
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Glu Thr Leu Ala Pro Phe Ser Ala Phe Ser Ser Leu Glu Phe Leu Asp
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Ile Ser Thr Pro Asn Leu His Ala Thr Pro Ile Glu Pro Ser Ala Ile
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 Glu Glu Arg Leu Leu Asn Leu Thr His Gln Lys Gly Gln Cys Val Phe  
 225 230 235 240  
 Tyr Pro Glu Gln Asp Leu Leu Thr Leu Ala Cys Tyr Gln Lys Val Leu  
 245 250 255  
 Ile Leu Pro Tyr Ile Tyr Asn Thr His Pro Phe Met Ala Asn Gln Lys  
 260 265 270  
 Arg Phe Ile Pro Asp Lys Lys Glu Ile Val Met Leu His Phe Tyr Phe  
 275 280 285  
 Val Gly Lys Pro Trp Val Leu Pro Thr Phe Ser Tyr Ser Lys Glu Trp  
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 His Glu Thr Leu Leu Lys Thr Pro Phe Tyr Ala Glu Tyr Ser Val Lys  
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 gtttatcaaa accgccagga gttgttttct caaatattatg ggcatgtttt tgataacccc 420  
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 Asp Leu Lys Lys Gln Gly Val Phe Leu Ala Met Lys Asp Phe Leu Trp  
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 85 90 95  
 Lys Gln Asp Phe Arg Ser Thr Phe Leu Ala Lys Phe Ile Pro Ile Thr  
 100 105 110  
 Thr Pro Asn Lys Glu Ile Lys Asn Val Tyr Gln Asn Arg Gln Glu Leu  
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 165 170 175  
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 180 185 190  
 Phe Leu Lys Asp Arg Val Ala His Tyr Arg Ala Lys Thr Ser Leu Glu  
 195 200 205  
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 210 215 220  
 Ser Phe Leu Ile His Leu Ala Tyr Tyr Leu Lys Lys Asn Tyr Phe Ile  
 225 230 235 240  
 Phe Phe Tyr Arg Asp Asn Asp Asp Phe Met Pro Pro Asn Ser Lys Asn  
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 65 70 75 80  
 Ala Gln Lys Ile Gly Arg Cys Asp Ile Ala Ile Thr Leu Asn Asn His  
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 Phe Tyr Ser Ala Phe Leu Leu Tyr Ala Thr Lys Thr Pro Val Arg Ile  
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Gly Phe Ala Gln Phe Phe Arg Ser Leu Phe Leu Ser His Ala Ile Ala  
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 130 135 140  
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 Lys Leu Ala Phe Asn Leu Pro Thr His Thr Pro Asn Thr Pro Lys Lys  
 165 170 175  
 Ile Gly Phe Asn Pro Ser Ala Ser Tyr Gly Ser Ala Lys Arg Trp Pro  
 180 185 190  
 Ala Ser Tyr Tyr Ala Glu Val Ser Ala Val Leu Leu Glu Lys Gly His  
 195 200 205  
 Glu Ile Tyr Phe Phe Gly Ala Lys Glu Asp Ala Ile Val Ser Glu Glu  
 210 215 220  
 Ile Leu Lys Leu Ile Lys Gly Ser Leu Lys Asn Pro Ser Leu Phe His  
 225 230 235 240  
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 245 250 255  
 Arg Ile Ala Val Leu Asp Leu Phe Ile Thr Asn Asp Ser Gly Pro Met  
 260 265 270  
 His Val Ala Ala Ser Met Gln Thr Pro Leu Ile Ala Leu Phe Gly Pro  
 275 280 285  
 Thr Asp Glu Lys Glu Thr Arg Pro Tyr Lys Ala Gln Lys Thr Ile Val  
 290 295 300  
 Leu Asn His His Leu Ser Cys Ala Pro Cys Lys Lys Arg Val Cys Pro  
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<212> DNA

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Glu	Val	Ser	Lys	Phe	Tyr	Tyr	Ala	Leu	Lys	Tyr	His	Ala	Lys	Phe	Met
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Lys	Cys	Ile	Glu	Leu	Asn	Glu	Ala	Ile	Cys	Ile	Leu	Glu	Asp	Asp	Ile
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Asn	Ile	Lys	Ser	Glu	Pro	Leu	Asn	His	Lys	Asn	His	Glu	Ile	Gln	Glu
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Tyr	Val	Ile	Thr	Pro	Lys	Ile	Ala	Lys	Val	Phe	Lys	Lys	His	Ser	Arg
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Gly	Val	Lys	Asn	Leu	Val	Leu	Gln	Pro	Phe	Val	Ile	Ala	Asp	Asp	Glu
225				230						235				240	

Gln Ile Ser Thr Ile Ala Arg Lys Glu Gln Pro Tyr Ser Pro Lys Ile  
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35 40 45

His Cys Leu Val Asp Asn Leu Ser Leu Glu Asn Gln Cys Lys Leu Lys  
50 55 60

Glu Thr Leu Ala Pro Phe Ser Ala Phe Met Ser Val Asp Phe Leu Asp  
65 70 75 80

Ile Ser Thr Pro Asn Leu Tyr Thr Pro Ser Ile Glu Pro Ser Ala Ile  
85 90 95

Asp Lys Ile Asn Glu Ala Phe Leu Gln Leu Asn Ile Tyr Ala Lys Thr  
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 Arg Phe Ser Lys Met Val Met Cys Arg Leu Phe Leu Ala Ser Leu Phe  
 115 120 125  
 Pro Gln Tyr Asp Lys Ile Ile Met Phe Asp Ala Asp Thr Leu Phe Leu  
 130 135 140  
 Asn Asp Val Ser Glu Ser Phe Phe Ile Pro Leu Asp Gly Tyr Tyr Phe  
 145 150 155 160  
 Gly Ala Ala Lys Asp Phe Ser Ser Pro Lys Asn Leu Lys His Phe Gln  
 165 170 175  
 Thr Glu Arg Glu Arg Glu Pro Arg Gln Lys Phe Phe Leu His Glu His  
 180 185 190  
 Tyr Leu Lys Glu Lys Asp Met Lys Ile Ile Cys Glu Asn His Tyr Asn  
 195 200 205  
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 210 215 220  
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 225 230 235 240  
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 245 250 255  
 Gln Leu Pro Tyr Ile Tyr Asn Thr His Pro Phe Met Val Asn Gln Lys  
 260 265 270  
 Arg Phe Ile Pro Asn Lys Lys Glu Ile Val Met Leu His Phe Tyr Phe  
 275 280 285  
 Val Gly Lys Pro Trp Val Leu Pro Thr Ala Leu Tyr Ser Lys Glu Trp  
 290 295 300  
 His Glu Thr Leu Leu Lys Thr Pro Phe Tyr Ala Glu Tyr Ser Val Lys  
 305 310 315 320  
 Phe Leu Lys Gln Met Thr Glu Phe Leu Ser Leu Lys Asp Lys Gln Lys  
 325 330 335  
 Thr Phe Glu Phe Leu Ala Pro Leu Leu Asn Lys Lys Thr Leu Leu Glu  
 340 345 350  
 Tyr Val Phe Phe Arg Leu Asn Arg Ile Phe Lys Arg Leu Lys Glu Lys  
 355 360 365  
 Leu Leu Asn Ser  
 370

<210> 13  
 <211> 843  
 <212> DNA  
 <213> *Helicobacter pylori*

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atcgccaagc ttttagaatg cgaaaaacat tttgaaatca ttcctgtttt taaaaatata 180  
cccgtttttt atgaccttaa aaaacaaggc gttttttggg cgatgaagga ttttttatgg 240  
ttattaaaag cgcttaagaa gcacaaaatc aaacacttga ttttagaaaa acaagatttt 300  
agaagcgctc ttttatccaa atttgtttcc ataaccactc caaataaaga aattaaaaat 360  
gcttatcaaa accgccagga gttgttttct caaatttatg ggcatgtttt tgataatagt 420  
caatattcca tgagttttaa aaaccccaaa aagattttta tcaacccttt cacgagagaa 480  
aataatagaa atatttcttt agaacatttg caaatcgttt taaaactgtt aaaacccttt 540  
tgtgttacgc ttttagattt tgaagaacga tacgcttttt taaaagatga agtcgctcat 600  
tatcgcgcta aaaccagttt agaagaagct aaaaacctga ttttagaaag cgatttgtat 660  
ataggggggg attcgttttt gatccatttg gcttactatt taaagaaaaa ttattttatc 720  
tttttttata gggataatga cgatttcatg ccgcctaaga atgaaaattt tctaaaagcc 780  
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taa 843

<210> 14  
<211> 280  
<212> PRT  
<213> Helicobacter pylori

<400> 14  
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Ser Leu Cys Glu Glu Ile Ala Leu Lys Gln Gln Gln Pro Leu Lys Ile  
20 25 30  
Leu Gly Thr Arg Leu Thr Leu Lys Ile Ala Lys Leu Leu Glu Cys Glu  
35 40 45  
Lys His Phe Glu Ile Ile Pro Val Phe Lys Asn Ile Pro Ala Phe Tyr  
50 55 60  
Asp Leu Lys Lys Gln Gly Val Phe Trp Ala Met Lys Asp Phe Leu Trp  
65 70 75 80  
Leu Leu Lys Ala Leu Lys Lys His Lys Ile Lys His Leu Ile Leu Glu  
85 90 95  
Lys Gln Asp Phe Arg Ser Ala Leu Leu Ser Lys Phe Val Ser Ile Thr  
100 105 110  
Thr Pro Asn Lys Glu Ile Lys Asn Ala Tyr Gln Asn Arg Gln Glu Leu  
115 120 125  
Phe Ser Gln Ile Tyr Gly His Val Phe Asp Asn Ser Gln Tyr Ser Met  
130 135 140  
Ser Leu Lys Asn Pro Lys Lys Ile Leu Ile Asn Pro Phe Thr Arg Glu  
145 150 155 160  
Asn Asn Arg Asn Ile Ser Leu Glu His Leu Gln Ile Val Leu Lys Leu  
165 170 175  
Leu Lys Pro Phe Cys Val Thr Leu Leu Asp Phe Glu Glu Arg Tyr Ala  
180 185 190

Phe Leu Lys Asp Glu Val Ala His Tyr Arg Ala Lys Thr Ser Leu Glu  
 195 200 205  
 Glu Ala Lys Asn Leu Ile Leu Glu Ser Asp Leu Tyr Ile Gly Gly Asp  
 210 215 220  
 Ser Phe Leu Ile His Leu Ala Tyr Tyr Leu Lys Lys Asn Tyr Phe Ile  
 225 230 235 240  
 Phe Phe Tyr Arg Asp Asn Asp Asp Phe Met Pro Pro Lys Asn Glu Asn  
 245 250 255  
 Phe Leu Lys Ala His Lys Ser His Phe Ile Glu Gln Asp Leu Ala Thr  
 260 265 270  
 Gln Phe Arg His Leu Gly Leu Leu  
 275 280

<210> 15  
 <211> 850  
 <212> DNA  
 <213> *Helicobacter pylori*

<400> 15  
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 atcgccaagc ttttagaatg cgaaaaacat ttgaaatca ttcctatttt tgaaaatata 180  
 cctgcttttt atgatcttaa aaaacaaggc gttttttggg cgatgaagga ttttttatgg 240  
 ttgttaaaag caattaagaa gcacaaaatc aaacatttga ttttagaaaa acaagatttt 300  
 agaagttttc ttttatccaa atttgtttcc ataaccactc ccaataaaga aattaaaaac 360  
 gtttatcaaa accgccagga gttgttttct ccaattttatg ggcattgttt tgataacccc 420  
 ccatatccca tgaatttaaa aaaccccaaa aagattttga tcaacccttt cacaagatcc 480  
 atagagcgaa gtatcccttt agagcattta aaaatcgctt taaaactctt aaaacccttt 540  
 tgtgttacgc ttttagattt tgaagaacga tacgcttttt tacaaaatga agccactcat 600  
 tatcgtgcta aaaccagttt agaagaagtt aaaagcctga ttttagaaag cgattttgat 660  
 ataggggggg attcgttttt aatccatttg gcttactatt taaagaaaaa ttattttatc 720  
 tttttttata gggataatga cgatttcatg ccacctaata gtaagaagga aaattttcta 780  
 aaagcccaca aaagccatta catagaacag gatthagcca aaaaattccg ccatttgggg 840  
 cttattataa 850

<210> 16  
 <211> 283  
 <212> PRT  
 <213> *Helicobacter pylori*

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 20 25 30  
 Leu Gly Thr Arg Leu Thr Leu Lys Ile Ala Lys Leu Leu Glu Cys Glu  
 35 40 45  
 Lys His Phe Glu Ile Ile Pro Ile Phe Glu Asn Ile Pro Ala Phe Tyr  
 50 55 60

Asp	Leu	Lys	Lys	Gln	Gly	Val	Phe	Trp	Ala	Met	Lys	Asp	Phe	Leu	Trp	65	70	75	80
Leu	Leu	Lys	Ala	Ile	Lys	Lys	His	Lys	Ile	Lys	His	Leu	Ile	Leu	Glu	85	90	95	
Lys	Gln	Asp	Phe	Arg	Ser	Phe	Leu	Leu	Ser	Lys	Phe	Val	Ser	Ile	Thr	100	105	110	
Thr	Pro	Asn	Lys	Glu	Ile	Lys	Asn	Val	Tyr	Gln	Asn	Arg	Gln	Glu	Leu	115	120	125	
Phe	Ser	Pro	Ile	Tyr	Gly	His	Val	Phe	Asp	Asn	Pro	Pro	Tyr	Pro	Met	130	135	140	
Asn	Leu	Lys	Asn	Pro	Lys	Lys	Ile	Leu	Ile	Asn	Pro	Phe	Thr	Arg	Ser	145	150	155	160
Ile	Glu	Arg	Ser	Ile	Pro	Leu	Glu	His	Leu	Lys	Ile	Val	Leu	Lys	Leu	165	170	175	
Leu	Lys	Pro	Phe	Cys	Val	Thr	Leu	Leu	Asp	Phe	Glu	Glu	Arg	Tyr	Ala	180	185	190	
Phe	Leu	Gln	Asn	Glu	Ala	Thr	His	Tyr	Arg	Ala	Lys	Thr	Ser	Leu	Glu	195	200	205	
Glu	Val	Lys	Ser	Leu	Ile	Leu	Glu	Ser	Asp	Leu	Tyr	Ile	Gly	Gly	Asp	210	215	220	
Ser	Phe	Leu	Ile	His	Leu	Ala	Tyr	Tyr	Leu	Lys	Lys	Asn	Tyr	Phe	Ile	225	230	235	240
Phe	Phe	Tyr	Arg	Asp	Asn	Asp	Asp	Phe	Met	Pro	Pro	Asn	Gly	Lys	Lys	245	250	255	
Glu	Asn	Phe	Leu	Lys	Ala	His	Lys	Ser	His	Tyr	Ile	Glu	Gln	Asp	Leu	260	265	270	
Ala	Lys	Lys	Phe	Arg	His	Leu	Gly	Leu	Ile	Ile						275	280		